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ABSTRACT

This booklet is intended to help teachers and prospective teachers of mentally retarded students to understand the ways in which intellect affects the understanding of reality. Its recommendations are based on G. Kylen's theory of the intellect and J. Piaget's theory of intellectual development. The initial section describes the function and organization of the intellect as well as the intellect's use of structure. Chapter 2 traces four levels of intellectual development through five categories of reality (space, time, quality, number, and cause). Each of these five categories is addressed in terms of the intellect and different levels of development. (CL)

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HOW OUR UNDERSTANDING OF REALITY DEVELOPS

EC/18/387

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HOW OUR UNDERSTANDING OF REALITY DEVELOPS

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FOREWORD

The task of spreading knowledge about intellectual and mental handicaps is part of the work undertaken by the Swedish Institute for the Handicapped in, among other things, providing aids for the handicapped. A large number of people from many professions and walks of life are involved with the handicapped and with the question of aids. Knowledge of the implications of a handicap, and the way that the intellectually handicapped/mentally retarded perceive and understand their surroundings is essential to the work carried out by these people. This knowledge plays a decisive part in structuring supportive measures in the form of social work, teaching methods and technical aids.

An earlier report "The Intellect and Intellectual Handicaps" by Professor Gunnar Kylen,* describes the intellect, intellectual development and the intellectual handicap.

In this document, Kerstin Göransson, psychologist and director at the research foundation ALA **, describes, on the basis of Kylen's theories, how the intellect affects our ability to preceive and understand the world we live in.

The Swedish Institute for the Handicapped.

* The Swedish Institute for the Handicapped, order no.1204/1981, and the ALA report no. 3/366c.

** Adjustment to Life and Work, a foundation affiliated to the RFUB (The National Society for persons with mental handicap)

INTRODUCTION

In this document I have attempted to describe the ways that the intellect affects our understanding of reality. I have based the theory of this work on Gunnar Kylen's theory of the intellect and Jean Piaget's theory of intellectual development. This report is aimed first and foremost at teachers at schools for the mentally handicapped and students training to be teachers of the mentally handicapped. It is my hope that this material will contribute to a better understanding of the intellectual handicap and the way it affects our conception of reality. This report should be seen as a supplement to Gunnar Kylen's "The Intellect and Intellectual Handicaps", and as a more detailed study of this field.

Finally, I should like to express my warm thanks to Gunnar Kylen, Cecilia Malmström, Hans-Gunnar Storm, Mats Granlund and Annika Wallgren, whose counsel and encouragement have been of considerable help. I should also like to thank Inger Andersson, our secretary, who typed this report.

Kerstin Göransson

THE INTELLECT

The function of the intellect

The intellect helps us form a conception of reality. Put very simply, it could be said that the intellect helps us do what we want to do. Our emotions (emotional processes) tell us what we want to do, and the intellect conceives the way we will perform the action.

Let us take as an example someone coming home from work one evening. He feels restless, **wants** to do something, but doesn't know what. He **considers** several alternatives; is there anything interesting on tv? - check in the newspaper. A walk, perhaps? - it looks like rain. Go out for a meal? - rather expensive, can't afford it. Go to the cinema? - look in the newspaper. Finally, he settles on a film. He finds out where it is showing, decides how to get there, checks the bus timetables to see which bus will get him there in time, and works out if he has enough money for a taxi home.

How does the intellect help us here? Firstly, by **considering** various alternatives **in our heads.** We must, of course, have some experience of the different options open to us, but that in itself is not enough: we must be able to refer to our experience and consider what it is like, for example, to take a walk, even though it is not an action we are performing just now. This is made possible by the intellect, which **reproduces** first-hand experiences so that we can **imagine** them even though they are not taking place at the moment. It is not until the C-level that we can imagine various options, compare them and decide what we want to do; and before we can perform these thought operations, we must have first-hand experience of the different alternatives.

We check the entertainments page of the newspaper to see if there are any interesting tv programmes on tonight. In order to do this, we must know that the tv progammes are published in the daily paper, we must find **today's** paper, we must be able to **read,** and by reading the

programme descriptions, understand **what** the programme is about. In order to forecast rain, we must **relate** large black clouds to rain, i.e. know that **if** the sky is cloudy and dark, **then** it will very likely rain. If we are to decide that eating out is too expensive, we must know roughly **how much** it costs, and compare that information with **how much** money we have. A decision to go to the cinema involves a sequence similar to that of deciding whether to watch tv. Having decided which film to see, we have to know **where** the cinema is, **when** the film starts, **how long** it takes to get there, **when** the buses run etc. Finally, we check **how much** money we have and whether it is **enough** for us to take a taxi home. What seems at first glance to be a simple situation, like the one described above, requires the intellect to do a considerable amount of work. And in an environment designed by, and for, people with normal intellects, there are many mentally handicapped people who cannot cope with this kind of situation.

Organisation in the intellect

The intellect organises experiences, categorising them by type of experience. Experiences fall into five categories:

Space (Where?)
Time (When?)
Quality (What?)
Number (How much/many?)
Cause (Why?)

The intellect's use of structure

In achieving stated goals, the intellect utilises previous experience and knowledge, i.e. the intellect performs **operations.** There is a difference between performing an action and performing thought operations. An example of performing an action is going to school.

Imagining the way to school, e.g. by describing it verbally, is a thought operation. Both thought operations and actions are performed in all five categories.

The intellect symbolises

The intellect represents reality by symbolising objects, events and characteristics. Symbols are important aids in communication, learning and thought operations, among other things. There is a difference between pictorial symbols, which are similar to the things they represent, e.g. a photograph, and semantic symbols, e.g. letters, which are arbitrarily chosen symbols. The intellect symbolises in all five categories.

Summary

The three functions of the intellect are;

To organise experiences - structure
To re-group experiences - operate
To represent experiences - symbolise

These three functions are performed in the following five categories:

Space
Time
Quality
Number
Cause

INTELLECTUAL DEVELOPMENT

The levels of intellectual development

It is known that the intellect develops in distinct levels, with a qualitative difference between each level. One difference between the first and second level is that at the second level it is understood that pictures and spoken language represent (symbolise) something real. One of the differences between the second and third levels is that at the third level changes can be imagined, i.e. one can combine different experiences and predict the result. Finally, one of the differences between the third and fourth levels is that at the fourth level abstract reasoning is understood, together with expressions such as proverbs, and concepts like liberty, beauty etc.

In most people, then, the intellect develops through four levels, with the fourth level corresponding to a fully-developed adult intellect. Everyone develops through these levels in the same order, and no level can be omitted. However, it is not true that we all remain at the same level for the same length of time. Since intellectual development stops at some time between the ages of 16 and 20, our intellectual development stops at different levels. Some people develop rapidly, while others develop more slowly and stop at the first, second or third level: these people have an intellectual handicap.

The levels are independent of age

The levels of intellectual development have nothing to do with age, they simply indicate **how** the intellect works. If we say that an adult is like a two year-old, it only means that his intellect corresponds to that of a two year-old. But an adult has far greater experience, an adult body etc., and these differences make him use his intellect in a completely different way.

When referring to intellectual handicaps, the levels are called A, B, and C levels, the first level being A.

Individual actions

Our understanding of our environment is based on the experience we gain from our own actions. Children learn about the objects in their surroundings by interacting with them. The sensory stimulus given by the object is understood on the basis of the actions performed in relation to the object. Here, actions imply that the individual changes his relationship to the surroundings, either by simply changing his physical position, e.g. moving his head, which gives a different visual perspective, or by interacting with the objects in his surroundings, e.g. by leafing through a book. The initial understanding of the environment is formed on the basis of individual actions. Thus, a book is "to leaf through", a chair is "to sit on", an apple "to eat", etc. The objects are defined (and understood) in terms of the actions that can be performed with them. In the same way as an infant discovers reality through its own actions, an adult must also learn by alternating theory with practical experience.

Sensory perceptions and their related actions are compared and understood by the intellect (thought). The result may be called knowledge or **experience of actions** performed in relation to sensory stimulus. Experience is something more than the sensory experience itself; it may be said to be the product of actions times sensory experience.

A "map of reality"

The experiences of activities related to our sensory experiences (knowledge) are arranged by the intellect into five basic groups (categories). These five categories are perceived in different ways

depending on how the intellect classifies the experiences, how well the symbolising function is developed, and the degree to which different experiences can be combined, i.e. the extent to which actions or thought operations can be performed. We can say that a "map" of reality is drawn. This map enables us to plan actions. The first map must be repeatedly re-drawn before actions performed on the basis of the map give the desired result. The "map of reality" is reconstructed as we mature biologically and our experience grows.

The five categories

As mentioned above, the five categories are space, time, quality, number and cause, each of which contains **elements** that constitute different aspects of reality. These elements are compared with each other and their **relationship** forms a pattern which characterises each category. Each category can be defined according to the **elements** included, their **relations** to each other, and the **structures** they form.

No category can be said to be more fundamental than the others, and the order they are described in has no practical or theoretical significance.

THE CONCEPTION OF SPACE

Anyone who has associated with intellectually handicapped people knows that many of them find it hard to find their way; they cannot move about in towns or in their own neighbourhood as easily as others. Why is this, and what exactly is nature of the ability to find one's way?

Finding the way is an ability developed in the intellect. In this context, it is usually referred to as the development of the conception of space. It can even be called a sense of direction. However, the conception of space is more than a "sense of direction", it is also the ability to distinguish and match different shapes (geometrical figures).

Geometrical figures (forms) are really scaled-down versions of the larger spaces we refer to when talking about a sense of direction; or to put it another way - the largest spaces are only scaled-up versions of smaller forms and geometrical shapes. We use our ability to separate and match shapes when, for example, cutting patterns and matching sizes to make clothes.

Among other things, the conception of space is the ability to recognise differences in shape. Tracing patterns and checking sizes is one activity where this ability is used.

Our conception of space is built on **places** and **points** which are sorted into a group. These places and points are **compared** with each other to see **where** they are in relation to each other. In this way, a conception of three-dimensional space is formed, where places and objects are seen as being behind, in front of, above, below, on, in or beside each other.

The intellect and the conception of space

Our understanding of spatial relationships is developed in the intellect. We may say the the intellect develops laws which explain the relationship of one place to another. These laws differ from one stage of intellectual development to the next. However, it is not true to say that the "laws" at a low level of intellectual development are wrong, or that the "laws" at a higher level are right; but these laws do become increasingly generalised, and will apply in a larger number of situations. However, our conception of space is not influenced by the intellect alone, but also by the type of experience we have had. For example, how well we know a particular area strongly affects our ability to orient ourselves: someone who has lived in a town for many years knows his way about better than someone who has lived there only a few months.

One of the laws I mentioned in the preceding paragraph comes into play when we notice that we have made a detour. Let's say we walk about a kilometer to the left, then walk straight ahead for a while, and then turn right and walk about a kilometre, we can conclude that it would have been quicker to go straight on in the first place, and not make a detour. We can deduce this because our conception of space allows us to draw conclusions about the relationship between the starting point and the destination, by evaluating the relationships between various topological markers (links, points). Many intellectually handicapped people cannot make that kind of deduction. They only compare landmarks in pairs and they never have an overview of the whole chain of

landmarks. Many intellectually handicapped people can never learn to orient themselves except by following topological markers as they occur in a sequence, as links in a chain - a chain that they can never see as a whole. They find their way just as we do when we visit a place we have never been to before. We fix on certain **landmarks** to look for, either by looking them up on a map or by asking the way. "You get off at the **Ängsvägen** bus stop, walk back the way you came until you get to a **kiosk** where you take the left fork. Follow that road past a **school** on the right and keep on until you reach a crossroads, where you turn right" etc.

We can say that the landmarks form links in a chain. One characteristic of this kind of chain is that we seldom know what relationship the starting point has to the last link in the chain. We notice that when returning, we have to retrace our steps along exactly the same route as we came. The landmarks are **paired**; the bus stop with the kiosk, the kiosk with the school, etc. The disadvantage of finding the way by landmarks alone, is that one is entirely dependent on the landmarks actually being there. The house that used to serve as a landmark may now be hidden by scaffolding, the bus may make a detour to avoid roadworks etc.

Many intellectually handicapped people can learn to find the way by following a succession of landmarks, which form a chain. If the chain is broken, they will become confused.

Our knowledge of topological relationships tells us that we can reach a given destination by several routes. Sometimes we tire of our usual route and try a new way, and it is by exploring new routes to our destination that we gradually build up a mental picture (map) of the topography of the area. We know where different places (houses, streets, shops, etc) are in relation to one another. Then we can easily find our way in the area, and even if we find ourselves on a street we have never seen before, we know where it is and which direction to take to reach the place we want to get to. We can also say that we know where to locate that street on our mental map, we know its position in relation to other places in the area. By "marking out" landmarks as described above, and by means of our knowledge of the location of places in relation to each other, we form a conception of space and learn to find our way about.

The reason that many intellectually handicapped people do not have an overall picture of an area is that their intellect has not formed a three-dimensional conception of spaces built up of an infinite number of points, each with a particular relationship to every other point. Their space is formed by a series of landmarks (points) which occur in a certain sequence, and their relative direction and location have no real significance.

The A level.

Our earliest conception of space is generally considered to be related to our own bodies. Our first experience of distance and position is from "playing" (grasping, sucking, etc) with our hands and feet; the people who take care of us as infants play an important part in forming our conception of our bodies, by touching different parts of our bodies when looking after us: this in turn has a major effect on our conception of space.

The next stage is when the infant begins to look for objects in its surroundings; e.g. reaching for an object it wants. At this level, children explore their surroundings by attempting to grasp an object that its senses perceive, i.e. something concrete and present in the environment. By comparing different aural and visual impressions from different objects, an intuitive (practical) knowledge of distance and position is formed. The child judges position and distance entirely on the basis of itself; here, over there, etc, i.e. it has a subjective conception of space.

Our knowledge of space develops as we move about (crawling, walking, in a wheelchair). Objects are seen from different angles and we begin to compare their relative positions, in pairs: the chair is in front of the table, the vase is on the table, the tv is beside the bookshelf etc.

An objective conception of space is increasingly brought into play by making comparisons of the position of one object in relation to another. The position of an object is no longer expressed in terms of our position in relation to it. This is only possible when so-called object permanence has developed, i.e. when we have learned that objects exist even though we cannot perceive them with our senses.

Although he cannot see the ball, Anders knows it is there. He has learned that objects exist even when they are not visible (A level).

Although Anders cannot see or perceive with his other senses the ball that has rolled under the chest, he knows that it is there and tries to get it out. The object has an existence of its own, independent of his actions and sensory perceptions.

Object permanence allows us to group objects in our surroundings in pairs. These pairs of objects are linked together to form chains. By forming numerous systems of pairs we are able to find our way around in our everyday surroundings - at home, at school, at work and so on. If we lack a comprehensive structure in which to place these pairs, the space built up in this way can never be particularly large. Put very simply, we can say that spaces are limited to the limits of sight and hearing. One never goes out of sight or hearing of one's starting point.

The B level

With the development of the evocative memory, it becomes possible to imagine objects and events that are not part of the surroundings just now. This is a prerequisite to the understanding that, for example, words and pictures represent (symbolise) something real that is not in evidence at the moment. This means that the areas (spaces) where we can find our way unaided, expand.

The space (area) where we can orient ourselves unaided is generally called the immediate surround. The difference between our conception of this immediate surround and other areas is that we can orient ourselves without being largely dependent on topological markers in the immediate vicinity, to the extent we are in other areas. For example, if we are to visit a place we have seldom been to before and it turns out that new houses have been built and old ones demolished, etc. since our last visit, we may become a little confused and could easily lose our way. If the same thing happens in an area we know well, it does not have the same effect, because we have a more comprehensive picture

of the direction and distance involved.

At this level of intellectual development, people learn to find their way about unaided in areas that are familiar to them: their home neighbourhood, the day-care centre area, the shopping centre etc. They build up an immediate surround which includes direction and distance. These different areas are not linked to each other to form a single large space. In other words they do not know where each separate area is in relation to the others. They are entirely dependent on sequences of landmarks to find their way between these areas, and direction and distance have no significance. They find the way by following a series of landmarks, with one landmark pointing the way to the next. Their cognition of space is entirely related to the spaces that they have first-hand experience of, and they do not think that places might exist that they have not seen themselves. The only space that exists is the space they have first-hand experience of.

It is hard for people with an intellectual handicap to find landmarks in surroundings that are very uniform.

It is important that intellectually handicapped people at this level learn as many chains as possible. Learning a chain requires several trips along the same route to find landmarks and memorise their sequence. Therefore easily-recognisable markers must be chosen. In the large housing estates, with large numbers of virtually identical apartment blocks it is hard to find landmarks, because the surroundings are so uniform. Learning to orient oneself in such neighbourhoods can be very difficult for intellectually handicapped people at this level. We often use aids to find our way - a map, a note of prominent features etc. Intellectually handicapped people at this level can read neither a map nor the written word to remind them of the route. Pictures of different landmarks would be a useful aid.

The C level

As the intellect develops, people begin to discern patterns which apply generally to different relationships between objects and events. The first more generally applicable laws are developed. By this I mean that deductions are made from first-hand experience, and there are attempts to make a systematic arrangement of all new experiences according to these deductions (laws).

As regards the conception of space, this means that the location of places can be expressed in terms of their distance and direction in relation to another place. Previously, the location of places was largely understood in terms of the topological markers to be passed in order to reach them.

At some time between the ages of 7 and 12, children usually begin to amuse themselves by hiding some treasure and drawing a map of the hiding-place. This is one way of understanding and putting to use the new conception of space, in which all places can be described in terms of distance and direction. This new understanding allows people's

conception of space to include places they have never visited. An understanding of the world and the universe begins to develop. This conception of space extends beyond the limits of first-hand experience.

Summary

Our conception of space helps us to find the way (sense of direction) and to identify and match different shapes (geometrical forms). It is built up of **places** and **points** which are organised in a group. Places and points are compared with one another to see **where** they are located in relation to each other. In this way our conception of three-dimensional space is formed, where places - objects - are located behind, in front of, over, under, in, on, or beside one another.

Some general laws on positions in space are also developed in the intellect. We know, for example, that if a chair is in front of a table and the table is in front of a window, then the chair is also in front of the window. We also know that the spatial relationship between two objects changes if the sequence changes, i.e. the chair is in front of the window does not mean the same thing as the table is in front of the chair. Knowledge of the general validity of these laws enables us to form a "mental map" of space, which we use to find our way about. For example, we can use this "mental map" to decide whether we have made a detour. Our understanding of the structure of space emerges from assimilated experience and intellectual development.

THE CONCEPTION OF TIME

The conception of time is formed by comparing **when** different events occur, and **how long** they go on for. In making these comparisons, we notice that they occur in succession. "First we'll eat, then we'll have a swim, the we'll go shopping" etc. The time perspective is extended from the limitations of **the present**, to include the future (after) and the past (before).

The conception of time expands from being wholly limited to first-hand experience, i.e. **when** events occur and **how long** they last being determined by comparing different first-hand experiences, to being less dependent on first-hand experience and actions, i.e. **when** events occur and how long they last being determined by comparing them with expressions of time that are not related to events experienced at first-hand: years, months, weeks, days, hours, seconds etc. It may be said that there is a transfer from a subjective to an objective conception of time.

Both intellect and experience are essential to the development of the conception of time.

The intellect and the conception of time

The intellect organises and compares events. But all organising is done according to the same principle. We can say that it is this principle that changes as different intellectual functions develop. Experiences and sensations are understood in a new way, with the result that the "old" principle is no longer valid, and has to be changed.

The A level

The earliest sensation of time originates in physical rhythms (pleasure

- discomfort). A feeling of hunger is followed by a sense of repletion, tension before defecation is followed by relief, etc.

We also become aware of a certain **sequence and duration in our actions.** Experience of sequential actions, for example, is gained when an infant grasps something, releases it and hears a thud; the child soon learns that these actions must take place in a certain order if the desired result is to be achieved. Another example is reaching for the ring of a musical box, grasping it, pulling it and hearing music. In addition to these examples, the period of time that activities last can be experienced for example, when a disagreeable feeling makes the infant scream. **The time it takes** for the person caring for the child to arrive and calm it is an important factor in forming an understanding of the duration of an action.

The evocative memory develops only towards the end of this stage. People without an evocative memory find it hard to imagine things that are not present. This means that the conception of time is, by and large, limited to the present. People with severe mental handicaps do not think about any other time than "just now"; they do not think about past or future events. However, they are aware of the rhythm, sequence and duration of their own actions, and this constitutes the basis for the development of the conception of time.

By the end of this stage, we have learned that objects have an existence that is more than an extension of our actions and sensory perceptions (so-called object permanence). We also have an evocative memory, which enables us to use our memories to recall and examine previous experiences and, within limits, imagine objects that are not present just now. One of the many signs of this development is that we begin to look for things. Before we begin looking for something, we must be able to imagine the object in question, even though it is not in evidence. We expect the object to be somewhere. In terms of the conception of time, this means that we are no longer strictly limited to the present; we begin to understand that there is a future.

The fact that people with severe mental handicaps live very much in the present and do not think about events that have happened or will happen, affects both their self-knowledge and their ability to postpone satisfaction (to wait). One factor involved in acquiring self-knowledge is the comparison of the reaction we provoke in different situations. We use these experiences to compile a more or less complete picture of ourselves, independent of the reaction we provoke "just now". We form an awareness of self.

As mentioned earlier, people with severe mental handicaps are not able to think about past or future events. However, they recognise events they have experienced before. Therefore they have to recognise the reaction they provoke if they are to build up a cohesive picture of self; in other words they must receive a similar response from one situation to another.

Since the conception of future time - what will happen next - is not fully developed, it may be difficult to be patient, and wait to have one's wishes satisfied. If the will is not satisfied at once, or very quickly, it is easy to believe that it never will be.

Kurt doesn't understand how long it is until Friday, when he is going home. When he feels that the days are passing and nothing happens, he grows angry, and hits someone.

> Kurt is a twelve-year-old with a severe intellectual handicap. One Monday the staff at the institute where he lives tell him that he will be going home on Friday. This makes him very happy. But Tuesday comes, and then Wednesday, and he is still at the institution. On Thursday, Kurt hits another inmate.

Kurt cannot understand the expression "on Friday". He can only understand that he is not going home "just now", but later.

Kurt's understanding of "later" does not reach as far ahead as Friday, so he becomes disappointed and anxious as the days pass and nothing happens. Kurt shows his disappointment and worry by hitting someone.

The B level

As mentioned above, the evocative memory begins to function just as the intellect develops from the A to the B level. At the B level, people begin to realise that they can represent (symbolise) real events and objects by means of words and pictures, which means that their ability to form a mental picture of past and future events is developing. This gives a far better ability to organise past and future events in the succession in which they occur. They can also begin to understand how long an action takes, by comparing it with another action. The ability to organise events in a time sequence and estimate their duration by making comparisons clarifies the concepts "before" and "after". They will understand "yesterday", "tomorrow" and perhaps even "the day after tomorrow".

Since the conception of time is still subjective, i.e. events are organised and compared on the basis of events experienced at first hand, expressions of time (Monday, Tuesday, in a week, in October, etc.) can be difficult to understand. However, their meaning can be

understood if they are described in terms of events that will occur before, for example, tomorrow. "First you must finish school, then go to the leisure centre, and after that you go home, have supper, watch tv and go to bed, and when you wake up it will be tomorrow and then you come to school and we'll go swimming".

Maria is an intellectually handicapped 15 year-old who lives in a student hostel. After school she usually goes to a leisure centre near the hostel. Every Monday, some of the people at the leisure centre go swimming. Maria likes swimming and would enjoy going with them, but she hardly ever has her swimming costume with her. Every Friday the leisure centre staff remind her to bring her costume on Monday - but that doesn't help. For a while the staff at the student hostel tried to help her by packing her swimming things in her school bag, but Maria doesn't want to be helped, she wants to manage on her own.

A calendar with a colour-coded page for each day might help Maria: by tearing off the pages, she links her actions to a time marker expressed as a colour (B level).

As mentioned earlier, it may be difficult at this level to understand expressions of time, even if their meaning is understood. The expression "Monday" is a statement of time that Maria does not

understand. She might be helped by a calender with a tear-off page for each day of the week, and with a different colour for each day. One could then say, "next time we see a blue page....", and relate the expression of time to Maria's action of tearing off a page and seeing a colour.

Since the conception of time is still subjective at this level, i.e. related to personal experience and actions, it can be difficult to make plans and decide what can be done in the space of, for example, an afternoon. We all know how much longer ten minutes seems if we are standing in a queue than if we are busy with something that amuses us. Planning activities on the basis of nothing other than "how long it seems" can be extremely difficult. A subjective conception of time also means that we cannot tell the time from a clock; but we can learn that it is time to eat, for example, when the hands of the clock are in a certain position.

> Gustav lives in a group home, and he often cycles down to the town centre on Saturdays. He knows that when the clock hands are in a certain position it is time to cycle home for his meal. If some special activity is planned for a Saturday at the home, which means that the time of the meal must be changed, Gustav cannot cycle into town - not because there isn't time, but because he cannot tell when to cycle home in time for his meal.

Learning to tell the time in this way gives very little scope for changes in routines. A watch with an alarm function would help Gustav, so that he could cycle into town even if the mealtimes were changed.

The C level

People at the C level begin to develop an objective conception of time, i.e. when an event occurs and its **duration** is decided by comparing the

event against a system of time measurement that is independent of their actions. Months, hours and seconds are examples of objective expressions of time.

The reason for the development of an objective conception of time at this level is largely that the ability to think is separated from actions. At an earlier stage of intellectual development, in order to understand "what happens if I do this" it is necessary to perform the action and see the result - it is not possible to imagine the result. People at the C level can, however, imagine the result of an action.

This separation of thought from action means that the intellect can seek cause and effect relationships and more generally valid principles concerning the way things work. People attempt to find "laws" which govern reality and which are independent of their own actions.

At the normal rate of development, this level is reached between the ages of 7 and 12, and we all know how children at that age seem to enjoy games which have a lot of complicated rules that must be followed. Sometimes making up the rules appears to be more important than the game itself. This may be regarded as a way of training to act according to more generally valid laws, and as an attempt to understand the real nature of these laws. Naturally, games also play a major part in emotional development, something which I shall not go into here.

Thus, the separation of thought and action means that the conception of time develops so that we begin to understand years, months, minutes etc, and also gain a better understanding of the scope of time, including past history and the future. The great interest shown at the age of 10 - 12 in museums and science fiction is an attempt to understand the passage of time, as is the interest in photographs of our parents and ourselves when small.

The conception of time is, then, highly developed at the C-level. People at this level can tell the time from clocks, and understand

expressions of time such as the days of the week, years, etc. It may, however be difficult for many intellectually handicapped people to understand their own position in time, because they have lived in many different environments, which have little to link then to each other; such as different institutions, student hostels, group homes, workplaces, etc. Photographs, written accounts, and possibly even visits to places where they used to live, may inculcate a stronger feeling of self and a more stable sense of identity. This is the case with intellectually handicapped people at both the B and C levels.

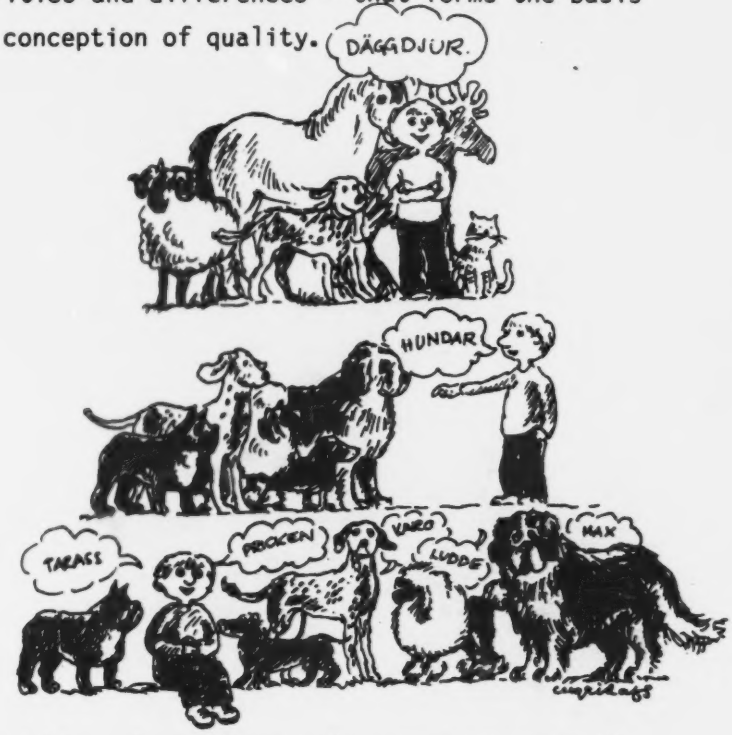
Summary

The conception of time evolves by comparing **events** in terms of **when** they occur and their duration. These comparisons lead to the understanding that several actions can take place simultaneously, or before or after each other; i.e. events form the relationship between **now, before** and **after**. These relationships are governed by two main principles. The first principle is that if I say "I went for a run before I had a shower, and I showered before I ate", then one can draw a **conclusion about the relationship** between the events "run" and "eat": in this case we know on the basis of the information received, that I ran before I ate. The second principle is that the statement "I ate before I ran" does not mean the same as "I ran before I ate". In other words, the **sequence of events** cannnot be changed without changing the meaning of the statement.

The intellect develops the conception of time from experiences. From having been largely limited to the present, and entirely subjective, the conception of time becomes objective and allows understanding of expressions of future, past, years, months, seconds, etc.

THE CONCEPTION OF QUALITY

The conception of quality is formed by making comparisons of the appearance and properties of **things** (objects), i.e. **what** they are. In making this kind of comparison we notice that objects can be **the same, different, or similar** in one or several ways. It is this ability - the ability to perceive similarities and differences - that forms the basis for the development of the conception of quality.



The development of the conception of quality can be seen as a pyramid, with many small classes at the base. At first, Tarass, Pricken and Ludde are individual entities, then they are seen as being similar - as dogs, which are then included in the class of mammals.

The intellect and the conception of quality

As the intellect develops and our experience grows, we learn to organise into groups objects with the same or similar characteristics. By comparing the objects in a group with each other, e.g. "things to sit on", we learn to recognise the differences and divide them into sub-groups, for example "chairs", "stools", "armchairs". If we compare objects that we originally perceived as being different, and therefore

belonging to different groups, we can find similarities among the different groups and form main groups, for example tables and chairs are organised into the main group of furniture. In this way we form a hierarchial system of classification, with each classification based on some characteristic common to all the objects in that class.

The development of the conception of quality can be seen as a pyramid. We begin at the base, where there are many small classes. In time, we find a more general classification system and organise our multitude of small groups into a smaller number of larger classes. For example, Pricken, Tarass and Kim are three quite separate entities, then we notice that they are similar in that they are all dogs, and dogs can be classified in turn as belonging to the larger class of mammals, etc. The intellect constantly strives to create the most highly developed hierarchial system possible.

The A level

At the first level, objects are defined according to what can be done with them. We can say that we define objects in terms of our own actions: a chair is "sitting", an apple "eating", etc.

Patterns of actions that have been learned through experience are transposed to new situations, involving new objects. Sucking and tasting are examples of patterns of actions which were originally used in feeding, but which are soon transposed to other situations: we suck and taste the sheets, our fingers, toys, etc. We then notice that objects are different to taste and to the touch. Another pattern which is frequently in evidence at this level is grasping - releasing. By learning about objects in our immediate surroundings in this way, we learn the uses of different objects. Early in the A level, no other objects exist than those we are handling at the moment.

We cannot imagine the existence of an object, but we can recognise

objects and understand what can be done with them. Adults with a normally-developed intellect act in a similar way when, for example, we leave a room to fetch something, and half way out of the room we cannot recall what we were on our way to fetch. We turn back into the room, and suddenly remember what it was. Something in the environment prompts our memory to recall what we were going for.

Later in the A level we begin to understand that objects have an existence even though we are not aware of them at the moment - object permanence develops. One of the ways this is expressed is that we begin searching for objects. Before we begin looking for objects, we must have a mental picture of them. This also allows us to form small classes of objects with which we perform the same action, e.g. "things we eat". But these classes only contain objects that we have first-hand experience of, for example things we have eaten ourselves. The degree of understanding we bring to bear when using objects depends largely on what experience we have.

> Karin is a woman with a severe mental handicap. One day she is given rosehip juice for dessert, served in a deep plate. She protests violently and refuses to eat. But when the juice is poured into a glass, she drinks it and seems to like it.

Karin probably reacts like this because she has no previous experience of eating fruit cream from a soup dish. She defines food as "eat", the plate as "eat from", and since the puree is liquid, it is defined as "drink", and one drinks from mugs or glasses, which are classified as "drink from". When Karin is served "drink" in "eat from", it is in conflict with what she has learned, and she protests. We would probably react in the same way if we went to a restaurant and were served soup in wine glasses and wine in soup dishes.

At this stage, a noun such as "toothbrush" signifies the action performed with it - not simply the toothbrush as an object, but the situation in which it is used, i.e. brushing your teeth.

Karin refuses to eat rosehip **juice** *from a plate because she has no previous experience of that action.*

The B level

As mentioned earlier, the evocative memory emerges just as the intellect develops from the A to the B level. This means that we can summon a mental picture of something that is not present, and this ability is essential to the understanding of symbols. The symbol function comes into use at the B level. In terms of the conception of quality, this means that we understand that a picture or word represents a real object. In contrast to the A level, the object represented by the word or picture can be separated from the action performed with it.

It may be said that the understanding of words develops from an understanding of situations to a specific understanding of objects. I call this a specific understanding of objects, because words or pictures only represent objects to us if we have first-hand experience of those objects. The word "books", for example, does not mean any books, but just the books we ourselves have seen. In terms of the way a normal adult intellect understands words, we can say that at the B level we understand words as if they were in the definite form, even if they are expressed in the indefinite form. Thus the word "books" is actually understood as meaning "the books".

At first this specific understanding of objects is so limited that a

word represents only one thing; the word almost has the value of a proper noun. "Chair", for example, means only one particular chair, and if you fetch a chair, it is that particular chair you fetch, since that is the only thing the word "chair" represents.

As we hear the word chair used in various contexts, referring to different objects, our understanding develops from "the chair" to "the chairs".

The evocative memory appears as the intellect develops from the A to the B level. It enables us to reproduce mental images - imagine objects that are not there; this is essential to the understanding of symbols.

But its meaning is still defined by first-hand experience. This means, for example, that we cannot choose between going to the cinema or going bowling if we have no previous experience of these activities and therefore do not know what they are. Having these activities described to me is not enough - I must do them myself first. This may also be one reason why people always make the same choice when deciding what to eat or what to do. They do not realise that they have many options.

People at the B level cannot imagine combinations of different experiences and form a mental picture of the result. All their knowledge of objects, their characteristics and their own thoughts about them is entirely limited to what they have experienced person-

ally. Therefore they must be exposed to many different objects, thus gaining a wide range of experiences to give them more options to choose from when deciding what to do, for example, when choosing what to eat.

A wide range of experience also means that they are less likely to find themselves in new situations which they do not know how to handle. However, they must have considerable self-confidence in order to venture to try new experiences - they must not be afraid of failure.

The C level

People at the C level can perform the mental operation of combining different experiences and predicting the result - they can draw conclusions. This is because the symbols that represent experiences, i.e. the mental pictures they have, are more stable, and are no longer seen simply as the actions they represent.

Since they can now draw conclusions, they are able to acquire new knowledge by mentally integrating different experiences - thoughts can replace actions. The fact that they can now acquire knowledge that is not directly linked to their own first-hand experiences, leads to the realisation that there is a general classification: objects, events, etc, that they have not experienced themselves.

In terms of the conception of quality, this means that they understand there are people that they have never met, animals they have never seen, food they have not eaten, etc. - these classes expand. When they realise that their own experience will not allow them to understand what a certain class includes (what something is), they begin to try to establish the boundaries of each class. In order to understand what the class "mountains" includes, they want to find out what the highest mountain in the world is, and the lowest; in order to understand what "animals" are, they want to learn about the world's largest, smallest, oldest, heaviest animals etc. This is an attempt to establish the

boundaries of different classes. At a normal rate of intellectual development, this, the third level, develops between the ages of 7 and 12. An interest in all kinds of records usually emerges around the age of 10.

A more general understanding of classes comes from efforts to establish what a certain class contains by trying to establish its boundaries, without being limited to first-hand experience alone. We can say that the conception of quality develops from a specific understanding of objects, to a general understanding of objects. This understanding may be termed general inasmuch as it is not limited to personal experience; we know for example, that animals exist that we have not seen. This is an understanding of objects where it is the concrete objects in a certain class that define the class itself. There is no understanding of the underlying concept of these objects. This idea is not understood until the fourth level, which is a normally-developed adult intellect.

Intellectually handicapped people take proverbs and figures of speech literally, e.g. "this is worth fighting for" is only understood at the concrete level (C level).

Since people at this level only have an understanding of concrete objects, they do not understand abstract classes, such as beauty or virtue. The class of beauty may contain personal attributes that are considered attractive; height, curly hair, blue eyes, etc.

Beauty is thus understood as something tangible. It is understood at the concrete level. Proverbs, such as "too many cooks spoil the broth" are understood literally, because the understanding of classes does not encompass the idea behind the utterance. In conversation, we often use phrases like "that's worth fighting for" and similar expressions. Just as with proverbs, intellectually handicapped people take these expressions literally, and believe that "fighting for something" means that people will literally come to blows. They take it literally because their understanding is limited to the concrete meaning.

Summary

The conception of quality is formed by making comparisons of the characteristics of different **objects**, i.e. **what** they are. As a result, we observe that objects may be **the same, different, or similar.** We also learn that these relationships work in a particular way. For example, "the sweater is the same colour as the sofa", means the same as "the sofa is the same colour as the sweater". Their **organisation** in relation to each other has **no meaning.** We also know that if "the sweater is the same colour as the sofa and the sofa is the same colour as the curtains", then the sweater and the curtains are the same colour. In other words we can draw **conclusions** about relationships between objects even if the relationships are not specifically stated.

The intellect creates a hierarchial system of classes. Each class is defined in terms of the common characteristics of the objects that belong to it.

The conception of quality develops from consisting of the action performed with objects, to being a function of the characteristics of the objects. We may say that it develops from an understanding of situations, through the specific understanding of objects and the general understanding of objects to the understanding of ideas, which is the fully developed intellect's normal conception of quality.

THE CONCEPTION OF NUMBER

We form the conception of number by comparing different quantities of objects and events to see **how much/many** there are. This comparison allows different quantities to be organised by **size** according to the number of objects in each quantity. Quantities can contain **as many, fewer, or more.** The simplest way of comparing two amounts is a one-to-one correspondence, pairing one from each amount, to see whether they are equal in number. For example, when laying a table, it is easier to put a plate in front of each chair rather than start by counting out a pile of plates. This is because when we pair a plate with a chair, we are pairing off two real objects which exist here and now. On the other hand if we begin by counting out the right number of plates, we have to make a one-to-one comparison of the plates with a mental image of the number of chairs.

The conception of number, then, compares two quantities. The external characteristics of the objects which form each amount must be ignored, and it must be realised that each object has exactly the same numerical value, whether it is a chair or a plate. The important factor is the number involved. Each object constitutes an equal part of the total number, i.e. the difference between, for example, three houses and one pen is as great as the difference between one hundred tomatoes and ninety-eight boats - two items. Recognition of this fact allows us to understand addition and subtraction. Another aspect of the conception of number is the understanding of "nothing" - i.e. that we can understand that there are, for example, "no pens".

As mentioned earlier, the simplest way of comparing two amounts is to take concrete quantities of objects and make a one-to-one correspondence. As intellect develops and experience increases, we learn that one, two, three, etc, are values that apply to all countables, that two is less than three, i.e. that numbers represent a sequence of quantity, that the difference between two and three is equal to the difference between two and one, and that zero represents total absence, an

absolute zero point. These three properties, **sequence, difference,** and **zero point,** are the basis of a general conception of number.

Numbers are used in different systems of measurement, depending on what it is we want to establish the amount of (measure). For example:

How long? (hours, seconds, etc.)
How heavy? (Kg, hg, etc.)
How far? (metres)
How fast? (k.p.h.)
How much is it worth? (money)

These systems require a general conception of number.

The A level

Quantities, then, are estimated by comparing two amounts. In the early stages of development, our understanding of quantities is very vague. The first intuitive understanding of values such as a lot - a little develops as we handle objects in our immediate surroundings. Different amounts of food are placed in babies' mouths, different objects give a different feeling of bulk in the mouth or hand, etc. In other words, the amount is determined for example, by grasping something, putting it in the mouth, and so on. The understanding of number is limited to the concrete amounts that can be handled. It may also be said that the number used as a yardstick for comparison, to establish how much of something there is, is based on the individual's own body and its relationship to the objects being handled.

Since we are constantly comparing quantities with our own bodies, i.e. determining amounts on the basis of our relationship to the quantity, the conception of number is very subjective. It is not the number of objects that indicates the amount, but rather factors of weight, size, and how bulky they feel to the hand.

Once object permanence has developed, i.e. we realise that objects have an existence independent of our actions; and as experience of handling objects in the immediate environment grows, we begin to compare various objects with each other. Instead of - as earlier - comparing things in terms of his own actions, i.e. his own relationship to an object, the child can now begin to compare objects with one another. The understanding of concepts like more than and less than emerges. However, this kind of estimate is still closely linked to weight and size. Games which collect and match objects, which develop further at the next level, lead to a better understanding of number and quantity.

The B level

At the B level it becomes more common to determine number by comparing different quantities of objects with one another. Instead of, as at the A level, comparing quantities with oneself, they are now compared with each other. Numbers are not understood at the A level. Among other reasons, this is because the comparison of amounts is a simple

People at the B level can begin to pair off objects.

one-to-one correspondence, since the child, which is only one in number, is one of the two amounts to be compared. On the other hand, at the B level, where comparisons of quantities of objects begins, it is possible to make a one-to-one corres-pondence of objects from two different quantities and see how many objects are left over. One example of a situation where a one-to-one corres-pondence of two quantities is made is when, in laying the table, a plate is placed in front of each chair. Making a one-to-one correspondence of different numbers of objects helps us realise that size and weight are not the only factors in determining quantity, there is also the number of objects. In other words an understanding of number begins to emerge. However, size, weight and number are all still applied as criteria when deciding which is the greater of two quantities, and it is still difficult to establish the relationship between these criteria.

At the beginning of the B-level the understanding of number is not related to numerical order. For example, before the concept of seven can be understood, it must be understood that the figure seven can symbolise seven of anything; i.e. we must be able to imagine a number. This imagined number is then compared with concrete quantities and it is then possible to decide whether there are more, fewer, or the same number: the two amounts are paired off, one by one.

People at the beginning of the B level, however, do not think in this way. They need to pair off quantities of real objects, for example, plates and chairs. It has happened that people at this level have learned the meaning of one, two, three, and perhaps a few other numbers, but their understanding of numerical expressions is extremely limited. This means that it is difficult for them to answer questions about "how many".

> Bertil lives in a large institution. If he is asked how many people he shares his room with, he usually answers three, five, four or some other figure. If he is then asked their names, he will answer, "Kjell".

Bertil is far from being ignorant or confused about the way he lives. He knows very well that he shares a room with Kjell, and only Kjell. But Bertil knows that if he is asked "how many?" or some similar question, then his answer must include a number. However, he does not understand the meaning of numbers, although he has learned numerical sequences and can count to a hundred. As the intellect develops at the B level, numbers are better understood and can be related to quantities. One can, for example, count the objects on a table, remove two of them etc. However, the understanding of numerical expressions is still limited.

Before we can understand money, we must understand numbers and the system of coins and notes. People at the B level have not learned to manage the currency system. Anna-Karin, for example, thinks that she always gets much more money back when she pays her bus fare with **one** ten crown note and gets four one crown coins in change. She can only compare the quantities that she can see in front of her at the time. She does not understand the exact value of coins or notes. However, people at the B level can learn to differ between a five crown note (yellow paper), a ten crown note (blue) and a one hundred crown note (large, blue paper). They can also learn roughly what articles can be bought for the different notes.

> Berit often cycles down to the shopping centre near her group home. She usually drops into the cafe in the shopping centre for a coffee and a bun. Berit knows that a ten crown note is enough, and always pays with one. She does not know whether she gets the right change, and cannot use coins herself. The staff at the group home usually count her coins and change them for notes, which she can use.

The C level

As mentioned earlier, people at the C level can mentally combine

different experiences and draw conclusions about what the result might be. At this level, thought can often replace action, and new knowledge is won that is not directly related to personal practical experience.

The conception of number at the C level develops to an understanding that numbers are infinite. People at this level understand the numerical system and can count to large numbers. They also realise that numbers represent different quantities, and they can use numbers to determine the number of objects there are in a given quantity. Thus they know for example, that five represents a quantity corresponding to the number five, seven a quantity corrseponding to that number, etc. Thus they evaluate the quantity of a concrete amount (counting) by comparing it with a mental picture of a quantity that is represented as a number. At the C level, people have no difficulty in answering the question "how many?".

They can add, subtract and sometimes even multiply and divide. Multiplication and division requires an understanding that there are several amounts that contain five of something, for example, and that the number of units of five can be counted. This leads to the understanding that three separate quantities of five objects totals fifteen.

Having understood that figures represent the number of objects in a given quantity, it is possible to count (measure) different characteristics of a quantity and understand the result. For example, towards the end of the C level, people can count the number of kilos a bag weighs, the number of objects in a room, how much a pair of jeans costs etc. These examples, kilos, objects, and money are the units that are counted, while the bag, the room, and the jeans are the quantities.

People at the C level can understand money and its value, and shopping presents no problem. As soon as they can perform the mental operation of integrating knowledge, they can also do mental arithmetic. However this operation is rather slow and they can still find it difficult to check their change when they are shopping.

Gull-Britt explains:

When I go shopping, it's difficult to tell how much change I should get, because I can't count too well. I have to trust the assistant, but I'm not sure that she's always right. When she counts out my change I always check it. That isn't too hard with small sums, but if I pay with a large value note such as one hundred crowns, I think it's very hard to keep up when they count your change. They count so quickly and it makes me a little confused: sometimes I ask if I've got the right change. Yes, says the assistant, but I do not know if that's right. I think it's all very difficult".

(From "Vi vet hur det är att vara utvecklingsstörd," published by LTS, 1979).

People who cannot count very well have to trust the shop assistant, who counts out the change rather quickly.

People at the C level understand the currency system, and know that money can be exchanged for goods. We can say that money symbolises the goods that it will buy, its value is understood in terms of what we can get for it. On the other hand the value of a cheque is determined by the amount of money we have in the bank to cover the cheque. The cheque can be said to be a symbol of money, which in turn symbolises goods. The same applies to credit cards. Intellectually handicapped people at the C level do not understand the difference between money and cheques. The cheque is perceived to be the same as money and they do not know that they must have money in the bank to cover a cheque they write.

Summary

Our conception of number is formed by making comparisons of different **quantities** and observing that they may be **as much as, more** or **fewer,** and can be organised in order of size. As experience increases and the intellect develops, the understanding of numbers evolves. We realise that a quantity can be divided into smaller quantities (units) which **have equal value** and are exactly the same as each other.

We form an understanding of number by handling objects ourselves. At the A level people compare quantities with themselves; how bulky an object feels, how heavy it is etc. There is a **one-to-one correspondence.**

At the B level, different quantities of objects are compared with each other. This develops an understanding of numbers, since a comparison leads to the discovery that quantities consist of many objects. **Many one-to-one correspondences** must be made to determine the number of objects in a quantity.

The understanding of numbers presupposes the understanding that they represent different quantities, and that quantities are made up of

different numbers of objects (units). We must also be able to make a mental comparison of the concrete quantity and the imagined number. The C level is the earliest stage at which people can understand numbers and use them to define a quantity. An understanding of numbers means that they can also understand, for example, the currency system.

THE CONCEPTION OF CAUSE

The conception of cause is the ability to **link separate events** to form a pattern where an event or an action has a given result. In other words we can say that the conception of cause consists of the ability to organise actions/events on an "if...then... basis"; actions and events are organised so as to answer the question "**why**".

Since the person performing an action always has a purpose (deliberate or incidental), i.e. an action is always performed to achieve a given result, the conception of cause plays a major part in the choice of action. The purpose of an action may be both biological and psychological in nature. For example, we may change the position of our bodies to relieve tired muscles, or sing to express happiness, etc.

The intellect and the conception of cause

As described earlier, reality is perceived in different ways at different levels of intellectual development, and this, naturally, affects the ability to make the connection between cause and effect. The pattern of cause and effect that is easiest to distinguish is an action or event which always produces the same result; e.g. if I turn on the tap, then water runs out. But, as we all know, most links are not as obvious as that. One and the same action/event may produce different results; different actions/events may sometimes produce the same result, and we are often unable to explain exactly why something has happened, or predict that it will happen; many factors affect each other in complex interactions that can produce many different results.

There are several ways of explaining why things happen or why things are the way they are. "Why does it rain?" is a question that can be answered by saying, for example, "because trees, flowers and vegetables need water to grow", (explanation of purpose): "because clouds consist of water vapour, and when clouds meet cold air the water vapour becomes

drops of water which fall as rain", (explanation of cause, and materialistic explanation): "because the clouds think it's fun to rain", (the hermaneutic explanation): or "because God is crying", (magical explanation). In this particular example the materialistic explanation and the explanation of cause must be considered the most correct, but other questions may be better answered by one of the other types of explanation. We can take as an example the question "why does she sit and rock all day long?", which can be answered, "because she has suffered brain damage" (materialistic explanation), "because she is under-stimulated" (the explanation of cause), or "because it makes her feel good" (explanation of purpose), "because she is full of anxiety and is trying to isolate herself from sensory stimulus" (hermeneutic explanation), or "because she is bewitched" (magical explanation). Events and actions are explained by using one or more of the above responses, depending on the level of intellectual development and experience, and on the kind of question asked. At the different levels, reality is organised in patterns of relationships, which are based on one or more of these explanation models.

The A level

People at the A level never think consciously about why things happen. Practical experience teaches them to link, more or less unconsciously, certain actions to certain results. The conception of cause, too, has its origins in an individual's own actions.

At first, cause and effect are not separated, i.e. action and results (goals), form a single whole. Patterns of actions often develop from having once, by chance, performed an action that gave a positive result, which was confirmed when the action was repeated. There is no deliberate "if...,then...," action.

As mentioned earlier, a person's own actions form the basis for his linking events/action with each other. Therefore if one wants to teach

someone with a serious mental handicap to perform a particular action in a particular situation to achieve a stated goal, i.e. linking the action and the result in a causal pattern, then one has to take the individual's own actions as the point of departure.

> Karin is nine years old, and lives in a large institution. The staff toilet-train Karin by putting her on the toilet after meals. Karin did not learn to use the toilet - she still had to wear incontinence pads. In the summer, Karin's group spent two weeks on the holiday island of Gotland. They stayed in a rented cottage and went on frequent outings, which meant that it was impossible to keep to the routines they had in the institution. One result of this was that the staff began to check whether Karin seemed to need to go to the lavatory, and when she behaved as if she needed to, she was either taken to a lavatory or behind a bush in the woods. By the end of the holiday, Karin had learned to use the lavatory.

Karin has never learned to use the lavatory; she connected visits to the lavatory only with meal-times. She did not understand the relation-ship between urinating and the lavatory, because at the institution she had never seen an adult do so.

The explanation is that while on holiday, Karin was given the opportunity to relate the sensation of a full bladder to the act of going to the lavatory, because the staff acted in response to Karin's behaviour. Previously, the act of using the lavatory had been linked to mealtimes. Since Karin grew up in an institution, she had never had the chance to learn this relationship from seeing other adults using the lavatory.

The evolution of object permanence (the realisation that objects have an existence that is independent of our own actions) is a precondition for the realisation that events are not caused only by our own actions, but can be influenced by other people, and by the characteristics of other objects. In other words, we begin to link certain objects/people with certain positive or negative events, and can therefore make a more conscious effort to bring them about or avoid them. Since people at this level can now define a goal, and have a mental image of the goals that will satisfy particular needs, it is possible to choose the action needed to reach a goal, i.e. develop signals.

> When Lars-Olof hurts himself and is bleeding, he pulls one of the staff over to the first-aid box, and asks for a plaster.

Roughly speaking, Lars Olof's thinking is, "if I hurt myself, **then** I must have a plaster". He can form a mental image of the goal (the plaster) and although he has no immediate sensory perception of a plaster, he knows where to get one, and he can choose an action that will achieve that goal.

People at the A level do not ask themselves why things happen; they simply try to find a link between an action and its result.

The B level

Once the symbol functions come into use, people understand that words

and pictures represent something real. The evocative memory, which begins to develop at the end of the A level, makes it possible to recall previous experiences. This, together with the symbol function, means that actions become less and less limited to the present. By using words and pictures we can recall objects, people, events etc, from past experiences. Words and pictures can even be used to recall the pattern of relationships between actions/events and their results - but they must be patterns of relationships between actions/events of which the individual has first-hand experience. The fact that these patterns can be recalled makes them more stable, and it becomes easier to select the correct action to achieve the intended result. An awareness develops of these patterns of relationships.

Once people have recognised certain relationships, they begin to ask "why" they exist. At the A level, people realise that objects are not just an extension of their actions - objects and people have an existence of their own. People at the B level develop an awareness of the personal will, and that actions are performed to achieve certain

At the B level, intellectual development and growing experience allows people to realise that there is an explanation for the fact that a ball will roll downhill without being pushed.

goals; then will and purpose is attributed to inanimate objects. When the question "why" is asked, it is because the purpose, the final goal, is of interest. For example a ball rolls downhill because it is going somewhere, just as a person will walk in order to get somewhere.

As experience increases and the intellect develops, people begin to realise that there could be other explanations for why things happen. For example, when people begin to notice that a ball will roll either because someone knocks it, or because it is on a slope, they begin to realise that there is an "explanation of cause" instead of the earlier "explanation of purpose". The explanation of cause, however, only applies to special situations that are part of one's personal experience. The explanation of the "ball rolling because it is on a slope" only provides knowledge of a relationship between balls and slopes. This knowledge cannot be applied more generally to give an understanding of, for example, the way sloping surfaces affect the movements of objects.

Even if people at the B level begin, albeit to a limited extent, to look for explanations of cause, they are strictly limited to the relationships between actions/events that are part of their personal experience, and these explanations cannot be generally applied. It is not possible, on the basis of one first-hand experience of a cause and effect relationship, to draw any conclusions about new relationships between actions/events; they must first be experienced personally.

Linking actions/events also implies a certain ability to predict what will happen if I do **something**. At the B level, people can only predict the result of actions/events they have experienced at first hand, because that is all they have from which to form patterns of relationships. This also means that it is difficult for them to know what to do if something unexpected occurs.

For example, Inga-Maj does not understand that her skis will not fit into a plastic bag. Not until she has tried for herself does she

understand that it cannot be done, because the bag is too small. For the same reason, it is difficult for Johan to know what to do when the traffic lights at a pedestrian crossing are out of order one day. Johan has linked the event "green man" with the action "cross the road", and the "red man" with "wait". When neither of these events takes place, it is difficult for him to decide upon a course of action.

The C level

At the C level, people can make mental combinations of different experiences and predict the results. I have described earlier how this leads to an understanding that things exist which they have not experienced themselves, which in turn gives them a more general understanding of reality. They now begin to become seriously interested in the cause of events - they look for an explanation of cause.

Not until this stage has been reached is it possible to think in what is commonly known as "if - then reasoning". At this level, one can, for example, understand the mental concept that if I try to put my skis into the bag, then they won't fit. The ability to reason, if - then, is still strongly linked to first-hand practical experience. They must have experienced for themselves both the "cause" and the "effect", although not necessarily in that particular combination of relationships. The example of the skis and the bag naturally requires an understanding of what skis and a bag are, and practical experience of the fact that sometimes objects do not fit where they were intended to go. The knowledge they have about cause and effect relations from first-hand experience can then be combined in a mental operation to form new cause and effects relationships. Since this only applies to personal practical experience, it may be said that the cause and effect relationships are concrete.

It is difficult for people at the C level to imagine many different

actions/events which all give the same result. It may be difficult to form a mental picture of the fact that there are several ways to reach "the goal". The ability to choose one of several courses of action presupposes the ability to form a mental image of what the result of each course of action could be. This means that their thought operations must take them a step further from reality, and many intellectually handicapped people at the C level find it difficult to think in that way; the process of reasoning becomes too abstract. Among other things, this makes it more difficult to choose a course of action to suit a particular situation.

> Krister, who is eighteen, is a member of a youth section of the National Association for Mentally Retarded Children, Young People and Adults (FUB). At a meeting, they were planning an excursion for the spring. Their destination was one of the country cottages owned by the association. The problem to be solved was how to get there. One option was to ring round all the parents and friends with cars and see if they could drive the group out there. This option, however, meant a great deal of preparatory work, deciding who would go in which car, assembly points and times, etc. But once that had been finalised, this option would be a simple and comfortable way to get out to the cottage, and would also mean that they would not have to worry about when they would have to start for home. Public transport was another option, but this would mean walking along a forest path, checking the bus times, etc. The advantage would be that the group could do everything, without help from parents and others, thus giving them a greater sense of freedom and independence. The third option was to hire a bus, but that would be rather expensive. On the other hand they would then avoid the disadvantages of public transport with the limitations of the bus schedules, and the need to walk quite a distance, and they could keep the advantage of managing everything themselves.

Weighing the advantages and disadvantages in order to decide on the best alternative is very difficult for many people at the C level. They must imagine the consequences (results) of each option, and then make a mental comparison of the pluses and minuses.

It is difficult for them to simultaneously hold several mental pictures of " if - then" reasoning. The majority of relations between actions/events that are formed at the C level are " simple", i.e. **one** action/event leads to **one** particular action/event.

Summary

The conception of cause is formed by linking actions/events, so that one action/event leads to another, giving us a pattern where an action/event is caused by some other action/event. Reality can be organised in a pattern of cause, which makes it easier for us to act in a way that will achieve what we want.

There are four distinct types of relationship. The "simple" one, where **one** action/event causes **one** other, **many** actions/events causing **one** and the same result, **one** action/event that can give many different results, and the relationship of many actions/events giving many results. Intellectually handicapped people organise most actions/events in simple relationships and it is difficult for them to understand any others.

There are several ways of explaining "why" there is a relationship between, for example two actions; depending on the amount of experience people have and their level of intellectual development. People at the A level never ask "why"; at the B level the question is largely about the purpose of an action/event, and at the C level, people want to know the cause of an action/event.

The Swedish Institute for the Handicapped is the national body responsible for aids for the handicapped. The Institute conducts surveys, R & D, provides information and training and carries out tests of technical aids, as well as infrastructure planning for people with reduced abilities. The Institute modifies vehicles for disabled drivers. The Institute is financed by central and local government funds.

ala

ALA (Adjustment to Life and Work) is a research group connected to the National Society for persons with mental handicap (RFUB). The research into mental retardation conducted by ALA is mainly of a psychological/ pedagogical character. It attempts to describe the nature of the handicap, its psychological effects on personality development, the interaction between the individual and the environment, and how the environment should be adapted to the intellectually handicapped.

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